

**REMARKS**

Claims 1-29 are pending in this application, claims 11-22 having been withdrawn from consideration. By this Amendment, claim 1 is amended and claims 27-29 are added. Support for the amendments to claim 1 and for new claims 27-29 can be found, for example in original claim 1 and in the instant specification at page 2, lines 12 to 21, page 3, lines 4 to 25. No new matter is added. In view of the foregoing amendments and following remarks, reconsideration and allowance are respectfully requested.

**Double Patenting**

A. **351 Application**

The Office Action provisionally rejects claims 1-10 and 23-26 under the judicially created doctrine of obviousness-type double patenting over claims 1-21 of U.S. Patent Application No. 10/895,351. Applicants submit that the Terminal Disclaimer filed herewith obviates the rejection. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. **204 Application**

The Office Action provisionally rejects claims 1-10 and 23-26 under the judicially created doctrine of obviousness-type double patenting over claim 12 of U.S. Patent Application No. 11/133,204. Applicants submit that the Terminal Disclaimer filed herewith obviates the rejection. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. **292 Application**

The Office Action provisionally rejects claims 1-10 and 23-26 under the judicially created doctrine of obviousness-type double patenting over claims 1-11 and 36-38 of U.S. Patent Application No. 11/134,292 (the "292 application"). Applicants respectfully traverse the rejection.

Each of claims 1, 7 and 8 are directed to "[a] carbon fiber composite material comprising an elastomer and a carbon nanofiber dispersed in the elastomer ..." (emphasis added). Each of the claims of the 292 application is directed to a composite including a thermoplastic resin and carbon nanofibers dispersed in the thermoplastic resin. The presence of a thermoplastic resin in a composite in no way teaches or suggests a composite including an elastomer. One of ordinary skill in the art would not have been motivated by the thermoplastic resin composites of the claims of the 292 application to prepare the elastomer composites recited in claims 1, 7 and 8. As the claims of the 292 application fail to disclose or suggest a composite including an elastomer, the claims of the 292 application fail to disclose or suggest each and every feature of claims 1, 7 and 8.

Claims 1, 7 and 8 are not obvious over claims 1-11 and 36-38 of the 292 application. Claims 2-6, 9, 10 and 23-26 depend variously from claims 1,7 and 8 and, thus, also are not obvious over claims 1-11 and 36-38 of the 292 application. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

D. 753 Application

The Office Action provisionally rejects claims 1-10 and 23-26 under the judicially created doctrine of obviousness-type double patenting over claims 23-26 of U.S. Patent Application No. 11/183,753. Applicants submit that the Terminal Disclaimer filed herewith obviates the rejection. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Rejections Under 35 U.S.C. §102/§103

A. Yonekawa

The Office Action rejects claims 1-10 and 23-26 under 35 U.S.C. §102(b), or in the alternative under 35 U.S.C. §103(a), over WO 90/10296 to Yonekawa et al. ("Yonekawa"). Applicants respectfully traverse the rejection.

Claim 1 recites "[a] carbon fiber composite material comprising an elastomer and a carbon nanofiber dispersed in the elastomer ... the elastomer in the composite material is in its uncrosslinked form, and has a spin-spin relaxation time (T<sub>2n</sub>) of its network component of 100 to 3,000  $\mu$ sec as measured at 150 °C by the Hahn-echo method using pulsed NMR technique" (emphasis added). Claim 7 recites "the elastomer in the composite material is in its uncrosslinked form, and has a first spin-spin relaxation time (T<sub>2n</sub>) of 100 to 3,000  $\mu$ sec ... as measured at 150 °C by the Hahn-echo method using pulsed NMR technique." Claim 8 recites "the elastomer in the composite material is in its crosslinked form, and has a first spin-spin relaxation time (T<sub>2n</sub>) of 100 to 2,000  $\mu$ sec ... as measured at 150 °C by the Hahn-echo method using pulsed NMR technique." Yonekawa does not teach or suggest such composite materials.

The Office Action asserts that Yonekawa discloses a composite material including carbon fibrils and rubber materials such as nitrile rubber, natural rubber, butadiene styrene rubber and alpha olefin rubbers. Notwithstanding this assertion, Yonekawa does not anticipate and would not have rendered obvious the composite materials of claims 1, 7 and 8.

Each of claims 1, 7 and 8 is directed to a composite material including an elastomer having a particular spin-spin relaxation time (T<sub>2n</sub>). As is evident from the instant specification, the spin-spin relaxation times (T<sub>2n</sub>) of claims 1, 7, 8 indicate that, in the recited composite materials, carbon nanofibers are homogenously dispersed in elastomer. *See* instant specification, page 3, line 4 to page 4, line 4; page 28, lines 15 to 18. It is well known that it is difficult to obtain composite materials in which carbon nanofibers are homogeneously distributed in a substrate, due to the tendency of carbon nanofibers to aggregate. *See* instant specification, page 1, lines 9 to 13. The present inventors have overcome this difficulty by combining carbon nanotubes with elastomers having particular properties under particular conditions.

The Office Action correctly points out that Yonekawa discloses a composite material including carbon fibrils and rubber material. *See, e.g.*, Yonekawa, pages 17 to 18. However, it is undisputed that Yonekawa fails to teach or suggest the particular spin-spin relaxation times ( $T_{2n}$ ) of claims 1, 7, 8. Yonekawa also fails to teach or suggest that carbon fibrils are homogenously dispersed in the disclosed rubber materials. In addition, in view of the well-known tendency of carbon nanofibers to aggregate, one of ordinary skill in the art would not expect that the composite materials disclosed in Yonekawa would include carbon nanofibers homogenously dispersed in elastomer. Moreover, the composite materials of claims 1, 7 and 8 exhibit high elasticity, which does not appear to be exhibited by the composite materials of Yonekawa.

As Yonekawa fails to teach or suggest composite materials including elastomers having particular spin-spin relaxation times ( $T_{2n}$ ), Yonekawa does not teach or suggest each and every feature of claims 1, 7 and 8.

Claims 1, 7 and 8 are not anticipated by and would not have been rendered obvious by Yonekawa. Claims 2-6, 9, 10 and 23-26 depend variously from claims 1, 7 and 8 and, thus, also are not anticipated by and would not have been rendered obvious by Yonekawa. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Fisher

The Office Action rejects claims 1-10 and 23-26 under 35 U.S.C. §102(b), or in the alternative under 35 U.S.C. §103(a), over U.S Patent No. 6,203,814 to Fisher et al. ("Fisher"). Applicants respectfully traverse the rejection.

Claims 1, 7 and 8 are set forth above. Fisher does not teach or suggest such composite materials.

The Office Action asserts that Fisher discloses a composite material including carbon fibrils in a matrix such as natural rubber, styrene-butadiene rubber and polybutadiene.

Notwithstanding this assertion, Fisher does not anticipate and would not have rendered obvious the composite materials of claims 1, 7 and 8.

As indicated above, each of claims 1, 7 and 8 is directed to a composite material including an elastomer having a particular spin-spin relaxation time ( $T_{2n}$ ), which permits carbon nanofibers to be homogenously dispersed in elastomer. *See* instant specification, page 3, line 4 to page 4, line 4; page 28, lines 15 to 18. The Office Action correctly points out that Fisher discloses a composite material including carbon fibrils and an elastomer matrix. *See, e.g.,* Fisher, column 7, lines 1 to 9. As discussed with respect to Yonekawa above, however, it is undisputed that Fisher fails to teach or suggest the particular spin-spin relaxation times ( $T_{2n}$ ) of claims 1, 7, 8. Fisher also fails to teach or suggest that carbon fibrils are homogenously dispersed in the disclosed matrices. In addition, in view of the tendency of carbon nanofibers to aggregate, one of ordinary skill in the art would not expect that the composite materials disclosed in Fisher would include carbon nanofibers homogenously dispersed in elastomer. Also, the composite materials of Fisher do not appear to exhibit the high elasticity that is possible with the composite materials of claims 1, 7 and 8.

As Fisher fails to teach or suggest composite materials including elastomers having particular spin-spin relaxation times ( $T_{2n}$ ), Fisher does not teach or suggest each and every feature of claims 1, 7 and 8.

Claims 1, 7 and 8 are not anticipated by and would not have been rendered obvious by Fisher. Claims 2-6, 9, 10 and 23-26 depend variously from claims 1, 7 and 8 and, thus, also are not anticipated by and would not have been rendered obvious by Fisher. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

#### New Claims

By this Amendment, new claims 27-29 are presented. New claim 27 is directed composite materials including elastomers having particular spin-spin relaxation times ( $T_{2n}$ ),

similar to claims 1, 7 and 8. New claim 28 explicitly recites that carbon nanofibers are homogenously dispersed in an elastomer. New claim 29 depends from claim 28.

Accordingly, for at least the reasons discussed above with respect to claims 1, 7 and 8, new claims 27-29 distinguish over the prior art of record.

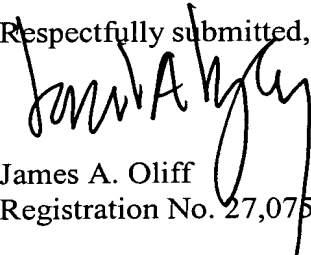
Applicants submit that claims 27-29 are patentable. Accordingly, prompt examination and allowance of claims 27-29 are respectfully requested.

Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-29 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachment:  
Terminal Disclaimer

Date: July 31, 2006

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